

# FreeSpeak<sup>®</sup> Digital Wireless Intercom Systems



## FreeSpeak Digital Wireless Intercom Systems

FreeSpeak® uniquely blends digital matrix technology with a locally distributed wireless "network". FreeSpeak operates license-free in the 1.8-1.9 GHz frequency band, free from the other crowded frequency bands where PC's, talent microphones and other wireless intercom systems operate. It has a market leading combination of DECT and wireless roaming technologies which allow the user to move freely in a production environment without fading or losing connection to the communications system.

FreeSpeak beltacks offer an unprecedented level of clarity, sophistication and connectivity. The beltacks can operate with FreeSpeak, a standalone intercom base station, or with FreeSpeak Integra, a seamless approach to integrating FreeSpeak beltacks directly with Clear-Com Eclipse Matrix Systems using an E-Que Card. Capabilities of the beltack can adapt to the functions offered by the main system (base station or Eclipse Matrix System).



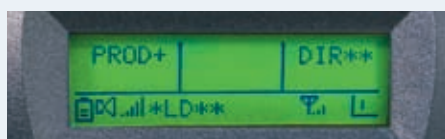
## FreeSpeak Wireless Beltacks

The FreeSpeak wireless beltack is a feature-rich unit that can be programmed to meet the user's needs. Two push-to-talk rotary encoders and multi-page display allow up to twelve communication routes to be assigned to each beltack. These can be any desired combination of group and point-to-point communication assignments. All twelve communication routes may be used simultaneously.

FreeSpeak beltacks bring audio clarity to users' ears with full duplex 7 kHz "commentator" bandwidth. This level of audio quality reduces the strain on the users' ears and improves work flow by reducing the need to repeat messages.

The cellular roaming technology used in FreeSpeak continually scans for the best available active antennas to connect with

and automatically switches seamlessly to offer unbroken coverage.



### Informative Displays

The large LED backlit display shows the name (label) of the beltack user, plus the names of the individuals and groups assigned to the beltack under each rotary encoder. Each of the pages is labeled on the display and is audibly signaled to the headset when the user changes the page. The beltack's battery level and signal strength are also displayed, with the added security of both visual and audible alarms.

### Beltack Features at a Glance\*

- Up to 6 communication routes per beltack
- Create 5-character labels for each beltack and connector
- Party-line call-alerting functionality with beltack vibration
- Secure system—beltacks are registered to a particular base
- Battery monitors displayed on base station
- Two battery options – typically 8-10 hours talk time using rechargeable Nickel Metal Hydride (Ni-MH) cells – also accepts disposable Alkaline AA Batteries

\* Features are only available when used with base station.

# FreeSpeak® Digital Wireless Intercom Systems

## Internal Menus

A variety of beltpack menus are accessible via the display using the scroll and enter buttons. Audio options such as headset levels, microphone levels, and local sidetone can all be adjusted. The thresholds of the alerts for low battery strength can be set by the user.

## Answer-back

The beltpack has an answer-back capability, using the large center button on the front of the beltpack. The answer-back key can be used to answer any incoming call to the beltpack, even if there is no identification label assigned to that caller. The caller can then be answered and conversed with by pressing and holding the answer-back key. The label of the caller appears on the display above this key.

## Power

The FreeSpeak beltpack is powered with a clip of four rechargeable AA size NiMH batteries. They will power the beltpack for approximately 8-10 hours of continuous use. Disposable Alkaline AA batteries can also be used. The beltpacks can be charged in two ways. First, by using the beltpacks internal charger circuitry, allowing NiMH batteries to be charged while still in the beltpack. Secondly, by using the specifically designed 5-way multi-bay battery recharger allowing standby rechargeable battery packs to be available. This allows the continued use of the beltpacks while the next set of batteries are being charged.

## Connection and Coverage

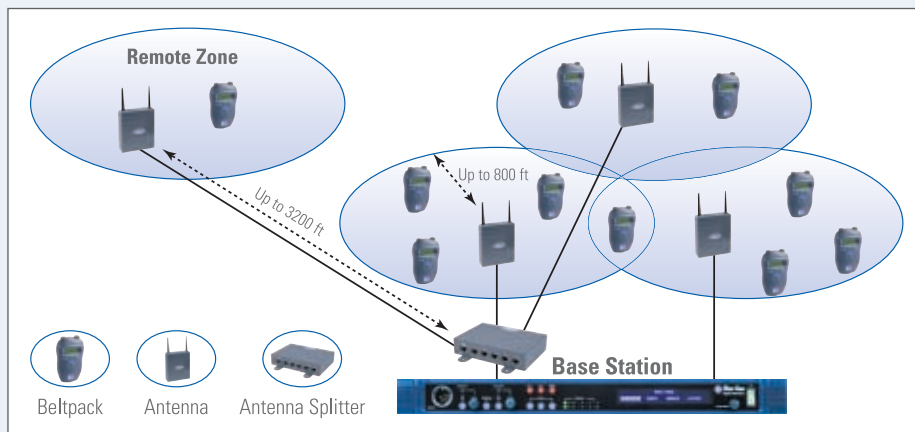
The connection between the FreeSpeak beltpack and the heart of the system (either the Base Station or E-Que card) is made through the Active Antennas, where the receive and transmit functions

take place. Each Active Antenna supports up to five full-duplex wireless connections with FreeSpeak beltpacks in one coverage area. By co-locating additional Active Antennas, more than 5 beltpacks can be supported in a particular area.

The omni-directional coverage area may be up to 800 ft (50 to 150m typical) in radius, although typical distances in production environments range from approximately 160 to 640 ft (50 to 200 m). 4-pair screened CAT-5 cable is used to connect the Active Antennas, either directly to the two antenna ports on the base, or via a 5-way splitter unit. Locally powered Antennas may be located up to 3,200 ft (1,000 m) away or 800 ft (250 m) when centrally powered from the base station. The E-Que card does not power its antennas centrally, but the splitter unit can be powered to centralize the power needed for the antennas.



## FreeSpeak



### Base Station with Beltpacks

The FreeSpeak base station serves as the heart of the wireless communication system for all digital wireless beltpack users. All wired and wireless communications flow through the base station. Each wireless beltpack and wired intercom connection on the rear panel has its own full-duplex port, and the voice communication from each is sampled, mixed, and re-routed throughout the system as desired.

The base station supports up to 20 wireless beltpacks, with a front-panel vacuum fluorescent display showing status and battery information. Each beltpack has its own timeslot and can be individually addressed by the base, allowing multiple combinations of beltpack-to-beltpack and small-group conversations to happen simultaneously.

### Highly Programmable

FreeSpeak is highly programmable with software menus on the base, accessible via the display and a push-to-enter rotary encoder. Alternatively the base station and beltpacks can be programmed by the PC-based software and then uploaded to the system via a standard CAT-5 Ethernet

cable. All aspects of the beltpacks, the rear-panel connectors, creation of communication routes and groups can be configured to meet the user's needs. Each beltpack, group and rear-panel connector can be labeled with a 5-character name, which appears on the base station and beltpack displays. Relative audio levels among beltpacks, and input and output levels for the wired connections are also under software control.

### Registering Beltpacks to the Base Station

Even in the most crowded RF environments, FreeSpeak remains a closed system to interference and eavesdropping. Each beltpack's unique ID is registered with the base station and only those beltpacks that are registered can communicate with the base station.

### Connectivity with Wired Communications

The system has 4-wire and party-line intercom connectivity on the rear panel of the FreeSpeak base station. This allows communication with other wired intercom systems.

- Two party-line connectors (with loop-through)
- Four 4-wire connections (transformer-isolated input/output)
- Program feed input
- Stage announce output
- Stage announce relay output

### FreeSpeak, Base Station Features at a Glance

- License-free 1.8 - 1.9 GHz DECT operations
- Supports up to 20 wireless beltpacks
- Point-to-point and small group wireless communications
- Creates user placed coverage zones with up to 10 remote antennas
- 10 LED active antenna indicators
- Locate active antennas up to 3,200 ft (1,000 m) from base station
- Create, name, and assign groups
- Two party-line and five 4-wire connectors
- Frequency and channel-hopping technology automatically finds clear spectrum
- Interrupted fold-back (IFB) functionality for on screen talents
- 5 wireless party-line groups
- Party-line call alert functionality



## FreeSpeak Integra

### FreeSpeak Integrated Wireless

The FreeSpeak Beltpack is designed to seamlessly integrate with the Clear-Com Eclipse Matrix Systems by directly fitting a Cell Controller card (E-Que card) into the matrix frames. The E-Que card provides connectivity between the beltpacks and any number of ports within the matrix system, therefore creating a truly seamless environment. This method allows up to 40 wireless beltpacks (depending on environment) to communicate on a wireless system.

FreeSpeak cellular auto-roaming technology enables beltpacks to continuously detect and automatically select the best connection to the matrix via the Active Antennas. In addition, FreeSpeak provides a role-based operation so that any beltpack can be switched to use the key settings saved for a particular user type or role.

### FreeSpeak Integrated Wireless Architecture

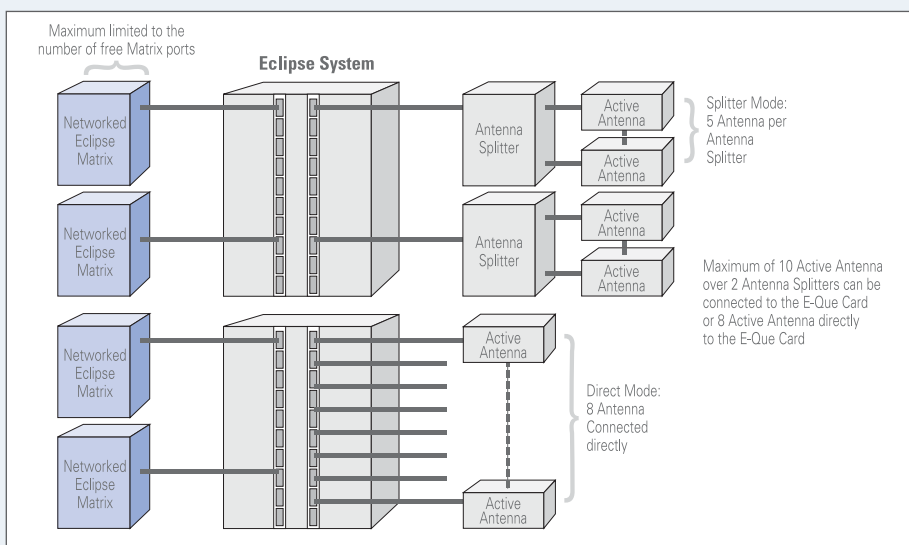
FreeSpeak Integrated Wireless operates

using a cellular network of DECT 1.8-1.9GHz Active Antennas that are located around the production environment. The Active Antennas are connected directly to the Eclipse Matrix and provide a radio cell supporting up to 5 full-duplex beltpack users. An Antenna Splitter can connect to 5 Active Antennas. To add users, simply add another Antenna, which connects directly back to the matrix that may be 3,200 ft (1,000m) away using a CAT-5 connection – no special RF cabling is required.

The rear of the E-Que has 8 x RJ45 connectors. The Eclipse Configuration Software (ECS) can run the E-Que in two modes: Direct or Splitter. In direct mode, all 8 RJ-45s are available for direct connection of Active Antennas. In Splitter mode, the first two RJ45 connectors are available for connection to PD2203 Antenna Splitters supporting up to five Active Antennas. The other RJ45 connectors cannot work antennas. All antennas and splitters will require local power from supplied AC adaptors.

### FreeSpeak Integra, Integrated Wireless at a Glance

- License-free 1.8 - 1.9 GHz DECT operation
- No frequency management required
- Up to 40 users per E-Que card (depending on the environment)
- Up to 4 E-Que cards can be used in one matrix (expanding up to 40 antenna per system)
- Up to 200 pre-set roles can be defined in the ECS management system
- Up to 800ft (50 to 150m typical) range under good radio frequency conditions. Adding more Active Antennas can extend the range
- Cellular Roaming –free roaming between antennas
- Patented DPA (Dynamic Port Allocation) technology allows the beltpacks to roam between Active Antennas without breaking connections to the matrix users
- Full duplex 7kHz "commentator" bandwidth for high-clarity communications
- Digital encoding keeps calls private
- Quick & easy programming of audio routes from the beltpack via standard software
- Seamlessly integrates with Eclipse Omega and Median matrices
- Two battery options – typically 8-10 hours talk time using rechargeable Nickel Metal Hydride (Ni-MH) cells – also accepts disposable Alkaline AA Batteries



## FreeSpeak, Beltpack-to-Base Station Specifications

| FreeSpeak, Base Station  |   |
|--|---|
| <b>Base-to-Beltpack Frequency Response</b>                       | 100 Hz – 7.1 kHz.   |
| <b>No. of Beltpacks per Base Station</b>                         | 20  |
| <b>No. of Transceiver/Antennas Supported by Base, Basic Base</b> | 10  |
| <b>No. of Active Antenna Ports</b>                               | 2   |
| <b>PC Programming Port</b>                                       | DB9   |
| <b>Relay Port</b>  | DB9   |
| <b>Party-Line Intercom A and Intercom B (each)</b>               | XLR-3F with XLR-3M loop through, on/off termination switch (via software)   |
| <b>Four-Wire/Matrix Connection</b>                               | 4 RJ-45 (Intercom 3 – 6)  |
| <b>Program Input</b>   | XLR-3F, transformer isolated, line-level input  |
| <b>Stage Announce Output</b>                                     | XLR-3M, transformer isolated, line-level output   |
| <b>Front-Panel Headset</b>                                       | 4-pin male connector with 2-channel capability and individual talks and listens   |
| <b>Front-Panel Display</b>                                       | 254 x 32 dot-graphic VFD  |
| <b>Front-Panel Indicators</b>                                    | 2 Talk LEDs for front-panel headset, CH A and CH B party-line enable LEDs, Program Input enable LED, 10 individual antenna LEDs |
| <b>Base-Station Programming/Editing</b>                          | Push-to-enter rotary encoder  |
| <b>Dimensions</b>  | 1RU unit, 1.75 x 19.0 x 12.5 in (44 x 483 x 312 mm) (HxWxD)   |
| <b>Weight</b>  | 10.8 lbs (4.9 kg)   |

| Beltpack                                    |   |
|---|---|
| <b>Audio Bandwidth</b>                      | 200 Hz - 7.5KHz (G.722)   |
| <b>No. of Pages</b>                         | 3   |
| <b>No. of Full-Duplex Audio Paths</b>       | Up to 6 with individual level control (3 pairs)                                       |
| <b>Mode of Operation</b>                    | Full Duplex on all routes   |
| <b>Level/Talk Controls</b>                  | 2 top-mounted push-to-talk rotary encoders  |
| <b>"Page" / Menu Scroll Buttons</b>         | 2   |
| <b>Enter / Answer-Back Button</b>           | 1   |
| <b>Frequency Spectrum</b>                   | 1.88GHz – 1.93GHz DECT Cellular auto-roaming technology                               |
| <b>RF Output</b>                            | 200mW Burst, 17mW average   |
| <b>Range</b>                                | Up to 800ft (50 - 150m typical) in good radio frequency conditions                    |
| <b>Battery</b>                              | 4 AA alkaline cells, Rechargeable: 4 AA NiMH cells                                    |
| <b>Battery Charging</b>                     | In unit, via external power supply connected to beltpack                              |
| <b>Battery Life</b>                         | 8 - 10 hours with 4 x Ni-MH – also accepts 4 x Alkaline AA cells                      |
| <b>Headset Connector</b>                    | 4-pin male, Clear-Com standard  |
| <b>Microphone Type</b>                      | Electret and Dynamic, selectable in beltpack menu                                     |
| <b>Microphone Level and Headset Limiter</b> | Selectable in beltpack menu   |
| <b>Headset Limiter</b>                      | Selectable from beltpack menu   |
| <b>Environmental</b>                        | -67° F to +158° F (-55° C to +70° C)  |
| <b>Dimensions</b>                           | Tapered design at largest points approx. 1.5 x 3.5 x 5.75 in (38 x 87 x 144 mm) (dwh) |
| <b>Weight</b>                               | 8.8 oz (0.25 kg) excluding batteries<br>12.4 oz (0.35 kg) including batteries         |

| Active Antenna  |   |
|---|---|
| <b>Beltpacks Supported Per Active Antenna</b>                 | 5   |
| <b>Active Antenna Transmission Range</b>                      | Up to 800 ft (50 - 150m typical) to beltpack (50 to 150m typical) |
| <b>Active Antenna Output</b>                                  | 200mW burst, 80mW average   |
| <b>Maximum Distance, Base to Antenna via Transceiver Port</b> | 3,200 ft (1,000 m) on 4-pair CAT-5 or better cable                |
| <b>Maximum Distance, Antenna Powered by Base</b>              | 975 ft (300 m) on CAT-5 or better cable                           |
| <b>Local Powering</b>   | 24VDC power supply  |
| <b>Connection to FreeSpeak Base</b>                           | RJ-45   |
| <b>Antenna Connector Type</b>                                 | SMA, two; supplied omnidirectional whip antennas                  |
| <b>Mounting</b>   | Via integral tabs with holes for screws                           |
| <b>Dimensions</b>   | 1.5 x 5.0 x 6.1 in (38 x 125 x 153 mm) (HxWxD)                    |
| <b>Weight</b>   | 14 oz (0.4 kg)  |

| Active Splitter                                 |  |
|---|--|
| <b>No. of Antennas</b>                          | 5  |
| <b>No. of Splitters Per Base</b>                | 2  |
| <b>Connection Between Base and Splitter</b>     | CAT-5 or better cable with RJ-45                   |
| <b>Connection Between Splitter and Antennas</b> | CAT-5 or better cable with RJ-45                   |
| <b>Powering of Splitter</b>                     | Locally powered via supplied external power supply |
| <b>Weight</b>                                   | 16 oz (0.45 kg)                                    |

| Transmission Method             |  |
|---------------------------------|--|
| <b>Method of RF Operation</b>   | Uses two slots per beltpack for wider frequency response |
| <b>Modulation</b>               | QPSK   |
| <b>Frequencies of Operation</b> | from 1.92 to 1.93 GHz (restricted by software)           |
| <b>RF Output</b>                | 250 mW burst, average as new FCC level 2 – 4 mW          |

## FreeSpeak Integra, Integrated Wireless Specifications

| System (Cell Controller Card, Active Antenna & Antenna Splitter)    |   |
|---|---|
| <b>Frequency Spectrum</b>   | 1.88GHz – 1.93GHz DECT Cellular auto-roaming technology   |
| <b>Size</b>   | <p><b>Cell Controller Card (in Matrix):</b><br/>Standard 6RU Eurocard (HxWxD)</p> <p><b>Active Antenna:</b><br/>6.18 x 5.04 x 1.61in (157 x 128 x 41mm)</p> <p><b>Antenna Splitter:</b><br/>6.18 x 5.04 x 1.61in (157 x 128 x 41mm)</p> |
| <b>Maximum Beltpacks per Cell Controller</b>                        | 40  |
| <b>Maximum Cell Controller Cards per Matrix</b>                     | 4   |
| <b>Maximum Antenna per Cell Controller Card</b>                     | 10  |
| <b>Connection between Cell Controller Card &amp; Active Antenna</b> | 2 x RJ45 (CAT 5 screened cable) up to 4,800 ft (1,500 m) from matrix  |
| <b>Environmental</b>  | -67° F to +158° F (-55° C to +70° C)  |

| Beltpack                                    |   |
|---|---|
| <b>Audio Bandwidth</b>                      | 200 Hz - 7.5KHz (G.722)   |
| <b>No. of Pages</b>                         | 6   |
| <b>Number of duplex routes per Beltpack</b> | Up to 12 with individual level control (6 pairs)                                      |
| <b>Mode of Operation</b>                    | Full Duplex on all routes   |
| <b>No. of Full-Duplex Audio Paths</b>       | Up to 6 with individual level control (3 pairs)                                       |
| <b>Level/Talk Controls</b>                  | 2 top-mounted push-to-talk rotary encoders  |
| <b>"Page" / Menu Scroll Buttons</b>         | 2   |
| <b>Enter / Answer-Back Button</b>           | 1   |
| <b>Frequency Spectrum</b>                   | 1.88GHz – 1.93GHz DECT Cellular auto-roaming technology                               |
| <b>RF Output</b>                            | 200mW Burst, 17mW average   |
| <b>Range</b>                                | Up to 800ft (50 - 150m typical) in good radio frequency conditions                    |
| <b>Battery</b>                              | 4 AA alkaline cells, Rechargeable: 4 AA NiMH cells                                    |
| <b>Battery Charging</b>                     | In unit, via external power supply connected to beltpack                              |
| <b>Battery Life</b>                         | 8 - 10 hours with 4 x Ni-MH – also accepts 4 x Alkaline AA cells                      |
| <b>Headset Connector</b>                    | 4-pin male, Clear-Com standard  |
| <b>Microphone Type</b>                      | Electret and Dynamic, selectable in beltpack menu                                     |
| <b>Microphone Level and Headset Limiter</b> | Selectable in beltpack menu   |
| <b>Headset Limiter</b>                      | Selectable from beltpack menu   |
| <b>Environmental</b>                        | -67° F to +158° F (-55° C to +70° C)  |
| <b>Dimensions</b>                           | Tapered design at largest points approx. 1.5 x 3.5 x 5.75 in (38 x 87 x 144 mm) (dwh) |
| <b>Weight</b>                               | 8.8 oz (0.25 kg) excluding batteries<br>12.4 oz (0.35 kg) including batteries         |

| Active Antenna  |  |
|---|--|
| <b>Beltpacks Supported Per Active Antenna</b>                 | 5  |
| <b>Active Antenna Transmission Range</b>                      | Up to 800 ft (50 - 150m typical) to beltpack       |
| <b>Active Antenna Output</b>                                  | 200mW Burst, 80mW average                          |
| <b>Maximum Distance, Base to Antenna via Transceiver Port</b> | 3,200 ft (1,000 m) on 4-pair CAT-5 or better cable |
| <b>Maximum Distance, Antenna Powered by Base</b>              | 975 ft (300 m) on CAT-5 or better cable            |
| <b>Local Powering</b>   | 24VDC power supply                                 |
| <b>Connection to FreeSpeak Base</b>                           | RJ-45  |
| <b>Antenna Connector Type</b>                                 | SMA, two; supplied omnidirectional whip antennas   |
| <b>Mounting</b>   | Via integral tabs with holes for screws            |
| <b>Dimensions</b>   | 1.5 x 5.0 x 6.1 in (38 x 125 x 153 mm) (HxWxD)     |
| <b>Weight</b>   | 14 oz (0.4 kg)                                     |

| Active Splitter                                 |  |
|---|--|
| <b>No. of Antennas</b>                          | 5  |
| <b>No. of Splitters Per Base</b>                | 2  |
| <b>Connection Between Base and Splitter</b>     | CAT-5 or better cable with RJ-45                   |
| <b>Connection Between Splitter and Antennas</b> | CAT-5 or better cable with RJ-45                   |
| <b>Powering of Splitter</b>                     | Locally powered via supplied external power supply |
| <b>Weight</b>                                   | 16 oz (0.45 kg)                                    |

| Transmission Method             |  |
|---------------------------------|--|
| <b>Method of RF Operation</b>   | Uses two slots per beltpack for wider frequency response |
| <b>Modulation</b>               | QPSK   |
| <b>Frequencies of Operation</b> | from 1.92 to 1.93 GHz (restricted by software)           |
| <b>RF Output</b>                | 250 mW burst, average as new FCC level<br>2 – 4 mW       |



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FreeSpeak® is available in all countries excluding the USA and Canada